

Experimental development of a Cherenkov detector applying colloidal suspension to improved atmospheric muon detection.

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This project presents the design and experimental development of a Cherenkov detector for atmospheric muons that incorporates solid-phase colloids to enhance detection efficiency. The detector medium consists of a TiO_2 nanoparticle suspension (average particle size ≈ 298 nm) dispersed in a glycerin–deionized water mixture at concentrations above 0.5 %, achieving a refractive index greater than 1.38. This modification is intended to increase Cherenkov photon production within the detection volume. The detector is composed of a 35 L polyethylene tank instrumented with four 6 mm silicon photomultipliers (SiPMs) operating in independent channels. The project is currently in progress, focusing on optimizing the optical properties of the colloidal medium and evaluating its potential to improve photon yield and detection efficiency compared to conventional water-based configurations.

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